

RESPONSE TO OFFICE ACTION

A. Status of the Claims

Claims 1 and 8-26 are pending. Claim 1 is currently amended. No new matter has been added by this amendment. Claims 12-26 have been withdrawn

B. Objections to the Claims

The Action objects to claim 1 for improper punctuation. Applicants have amended claim 1 and now believe the objection is moot. Withdrawal of the objection is respectfully requested.

C. Rejection Under 35 U.S.C. §112, Second Paragraph

The Action rejects claim 1 for lack of antecedent basis. Applicants have amended claim 1 and now believe the rejection is moot. Withdrawal of the rejection is respectfully requested.

D. Rejections Under 35 U.S.C. § 103(a)

Claims 1 and 8-11 are rejected under 35 U.S.C. § 103(a) as obvious in view of Trulson *et al.* EP 0 262 972 A2. Specifically, the Action asserts that Trulson *et al.* describe production of chimeric cucumber plantlets, including some with transgenic roots and wild-type shoots, stem and leaves. The Action next asserts that Simpson *et al.* and Savka *et al.* describe transformation of soybean using *A. rhizogenes* to form transformed roots. Thus, the Action finds Applicants' invention would be *prima facie* obvious to one of skill in the art in the absence of contrary evidence. Applicants respectfully traverse.

1. Trulson *et al.* Do Not Teach Formation of Chimeric Plants.

Applicants' claims are not rendered obvious because neither page 6, nor any other portion of Trulson *et al.* teaches or suggests *chimeric plants comprising transformed roots and wild type shoots, stems, and leaves* as is explicitly recited in claim 1. The Action asserts in particular

that the reference describes creation of plantlets produced without selection containing “some transgenic tissue and some wild-type tissue” and asserted that “[s]ince *Agrobacterium rhizogenes* transformation produces transgenic root tissue, some of the roots produced are transgenic and some are not.” Action pp. 4-5; emphasis added. The claims were therefore asserted to be anticipated. However, as explained below, Trulson *et al.* neither teaches nor suggests such a conclusion.

Trulson *et al.* do not teach chimeric plants as required by the current claims. Specifically, Trulson *et al.* teach that for both Series A and Series B tests, roots produced by inoculated tissue are excised at 5-10 mm in length and placed on CTM-2 Medium. Trulson *et al.*, p.6 ll. 4-8. The only difference between the Series is that for B, the CTM-2 Medium also contains kanamycin. *Id.* Once embryoids appear on an individual excised root, the embryoids are transferred to CTM-3 Medium and allowed to mature, at which point they are transferred to CTM-4 Medium to develop into plantlets, but no difference in the CTM-3 or CTM-4 Medium is taught for Series A versus Series B. *Id.* at p.6 ll. 9-13 (“*embryoids* that appeared on *the root*...were *detached* and *transferred*...,” (emphasis added)). A plantlet, according to Trulson *et al.* at page 4 line 10, is *a plant sufficiently developed to have a shoot and a root* asexually reproduced by cell culture. (emphasis added). Considering both Series together, of the 691 individual excised roots harvested from tissue inoculated with *A. rhizogenes*, only 64 regenerated into individual plantlets (11 in Series A and 53 in Series B) and of those, only 22 were positive for the inserted gene (2 in Series A, 20 in Series B) when tested by Southern blot analysis. *Id.* at p. 6 ll. 45-55 ; Table 1.

Thus, all that Trulson *et al.* teach is that for both Series A and B, individual excised roots produced from inoculated cucumber tissue, which may or may not be transgenic because inoculation does not guarantee transformation, are allowed to form embryoids from which

plantlets having at least a root and a shoot (which are either both transgenic or both not depending on the particular plantlet they are growing on) are allowed to grow. Clearly, then, *an individual plantlet that comprises both transgenic and non-transgenic tissues*, is not taught by Trulson et al., regardless of Series. Further, according to Table 1, both Series resulted in plantlet “populations” wherein some of the individual plantlets were NPT positive and thus transgenic, and some were not. However, neither Series is taught as resulting in a population of *plantlets having some transgenic roots and some wild-type shoots, stems and leaves*.

In contrast, Applicants’ claims are directed towards a method for producing a stably transformed chimeric dicotyledonous plant having transgenic root tissue and wild type shoots, stems and leaves. Applicants’ method for producing a chimeric plant involves transforming a suitable explant that is capable of maintaining a non-transgenic stem, leaves and other plant structures after inoculation with *A. rhizogenes*. *Id.* at p. 7 ll. 12-14. An incision or wound is made in the explant, which is preferably a stem, hypocotyl or similar structure. Next, the explant is inoculated with *A. rhizogenes* at the wound site. Transgenic roots can then be induced at the inoculated end of the explant. *Id.* at p.7 ll. 15, 19-21, and 26-29. Using Applicants’ claimed method, once roots begin to grow on the explant, the entire chimeric plant may be grown in soil or hydroponics rather than media because the wild type shoots, stems and leaves support the transgenic roots. *Id.* at p.7 ll. 31-34.

According to the M.P.E.P., to establish a *prima facie* case of obviousness, the prior art reference (or references when combined) must teach or suggest all the claim limitations. M.P.E.P. § 706.02(j). In light of the above, Applicants respectfully submit that Trulson *et al.* fails to teach the production of *a stably transformed chimeric dicotyledonous plant having*

transgenic root tissue and wild type shoots, stems and leaves, and thus the 103 rejection must be withdrawn such action is hereby respectfully requested.

2. Neither Simpson et al. nor Savka et al. Teach Production of a Stably Transformed Chimeric Soybean Plant

The Action cites Simpson *et al.* and Savka *et al.* as teaching soybean plant systems which may be transformed using *A. rhizogenes*. Action p.6. However, because Trulson *et al.* do not teach a stably transformed chimeric dicotyledonous plant, as thoroughly explained above, the claims can only be obvious if Simpson *et al.* and Savka *et al.* teach or suggest this missing element of Applicants' invention. As explained below, this is not the case.

Savka *et al.* relate to use of hairy root cultures for propagation of soybean cyst nematodes, and the transformed tissues are maintained as root cultures. *E.g.* page 504, right column; page 507, right column. Savka *et al.* also explain that no opine-positive transformed roots were induced from hypocotyl inoculation; transformed roots were obtained from globular callus that developed at the inoculation site on cotyledons. Abstract. Thus, Savka *et al.* do not describe a successful method of obtaining transformed roots from soybean hypocotyl explants. Further, no chimeric plants are described or apparently contemplated in Savka *et al.*

Simpson *et al.* likewise describes development of transformed root clones. *e.g.* page 409, section entitled "Plant Transformation", including Table 2. Specifically, Simpson *et al.* state that "...we inoculated inverted stems or hypocotyls of...soybean. The resulting **roots were excised** and transferred to hormone-free media and grown as separate root clones." p. 409, left column, bottom paragraph, emphasis added. Additionally, Simpson *et al.* note difficulties with soybean, particularly, "a high background of non-transformed roots." Abstract. Simpson *et al.* do suggest fully transformed plants might be regenerated from transformed roots. p. 411, right column,

paragraph 2. Yet, nowhere do Simpson *et al.* describe production of a stably transformed chimeric plant as presently claimed.

In light of the above, Applicants respectfully submit that no combination of the cited references teach or suggest the production of *a stably transformed chimeric dicotyledonous plant having transgenic root tissue and wild type shoots, stems and leaves*. Therefore Applicants' invention is not rendered obvious from them and withdrawal of the 103 rejection is thus respectfully requested.

CONCLUSION

In light of the foregoing, applicants submit that all claims are in condition for allowance, and an early indication to that effect is earnestly solicited. The examiner is invited to contact the undersigned (512) 536-3085 with any questions, comments or suggestions relating to the referenced patent application.

Respectfully submitted,

/Robert E. Hanson/

Robert E. Hanson
Reg. No. 42,628
Attorney for Applicants

FULBRIGHT & JAWORSKI L.L.P.
600 Congress Avenue, Suite 2400
Austin, Texas 78701
(512) 536-3085

Date: July 27, 2007